

# Notes on the Biology of *Ctenophthalmus p. pseudagyrtis* Baker in the Northeast (Siphonaptera: Hystrichopsyllidae)

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**Abstract:** *Ctenophthalmus p. pseudagyrtis* Baker occurs on a wide variety of mammals, and occasionally on birds. It occurs in greatest numbers on Cricetidae, Talpidae, and Soricidae. A population peak occurs in March–April in the northeast, but the species is taken throughout the year. Unlike most flea species, this one shows nearly equal collections of males and females except during the winter months. No habitat preference is clearly demonstrated, except that underground nests and burrows appear to be essential.

Life history studies on fleas have been restricted for the most part to a few species of public health importance. Many abundant species which are important to the ecology of their wildlife hosts remain to be studied. One of the most abundant of northeastern fleas is *Ctenophthalmus p. pseudagyrtis*, a species which shows very little host specificity and very wide distribution. The present study uses data from collected specimens, and is not based on observations of living individuals.

Most prepared slides of fleas include data on locality, date, and host. A few contain indication of elevation or habitat type. From such data, certain facts of the ecology of the species may be deduced with comparative certainty. The most serious shortcoming is that collections are often more or less random as to time and place, with collecting often concentrated in the warmer months. Thus, data on host distribution are quite dependable, while data on seasonal distribution may reflect the seasonal activity of the collector rather than that of the flea. When data on habitat are available, and when collectors sampled a wide variety of ecological conditions, such data are valuable.

The data for this study were taken from collections made by the New York State Museum and Science Service (Benton and Krug, 1956; Connor, 1960; Benton, 1966, and several unpublished lists); the Pennsylvania Game Commission (Holland and Benton, 1968); many students and friends (Cummings, 1955; Benton and Smiley, 1963; and many unpublished records); and from

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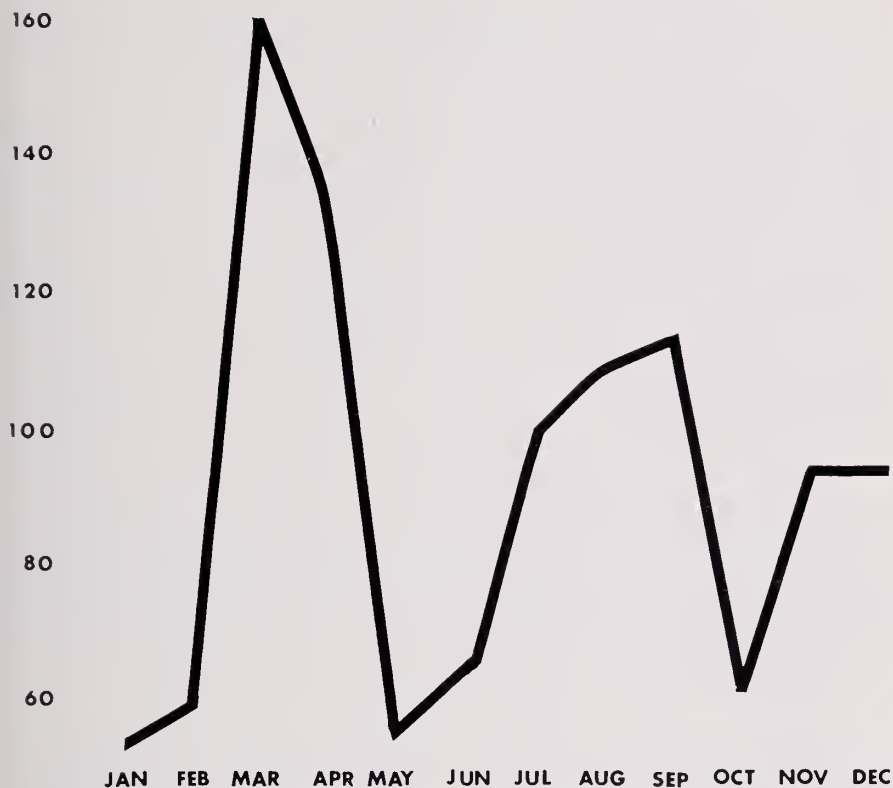


FIG. 1. Numbers of specimens of *Ctenophthalmus p. pseudagyrtes* for each month, based on 1,101 individuals.

publications on the fleas of New Jersey (Burbutis, 1956); New York (Geary, 1959); Vermont (Osgood, 1963); and New England (Parsons, unpublished MS; Main, unpublished MS).

#### SEASONAL DISTRIBUTION

Most species of fleas show distinct seasonal fluctuations in numbers, and many have been reported as adults during only part of the year. As shown in Fig. 1, *Ctenophthalmus pseudagyrtes* occurs in the adult stage throughout the year. There is an obvious peak in early spring, and a second peak in late summer. The latter may reflect increased collecting activity during the warmer months.

The spring peak coincides closely with the resumption of breeding by its most important hosts. Reproduction is greatly reduced or entirely stopped from late November to early February in local populations of *Microtus*, *Pitymys* and other small mammals. First litters produced in late February or early March coincide with the rise in flea specimens.

TABLE 1. Host distribution of 1,217 individuals of *Ctenophthalmus p. pseudagyrtes* from the northeastern United States.

<i>Microtus pennsylvanicus</i>	376	<i>Sorex cinereus</i>	3
<i>Blarina brevicauda</i>	250	<i>Otus asio</i>	3
<i>Pitymus pinetorum</i>	146	<i>Tamiasciurus hudsonicus</i>	2
<i>Clethrionomys gapperi</i>	90	<i>Sciurus carolinensis</i>	2
<i>Peromyscus</i> spp.	89	<i>Ondatra zibethica</i>	1
<i>Scalopus aquaticus</i>	72	<i>Glaucomys volans</i>	1
<i>Condylura cristata</i>	54	<i>Glaucomys sabrinus</i>	1
<i>Parascalops breweri</i>	38	<i>Zapus hudsonius</i>	1
<i>Tamias striatus</i>	31	<i>Erethizon dorsatum</i>	1
<i>Rattus norvegicus</i>	20	<i>Sylvilagus floridanus</i>	1
<i>Mustela</i> spp.	9	<i>Mus musculus</i>	1
<i>Synaptomys cooperi</i>	8	<i>Neotoma magister</i>	1
<i>Napeozapus insignis</i>	6	<i>Marmota monax</i>	1
<i>Didelphis marsupialis</i>	3		
<i>Microtus chrotorrhinus</i>	3		
<i>Sorex fumeus</i>	3		
		Total fleas	1,217
		Total hosts:	29

A direct connection between the reproductive cycle of the host and that of the flea has been shown for the European rabbit flea, *Spilopsyllus cuniculi* (Mead-Briggs, 1964; Rothschild and Ford, 1964). The closely timed upsurge in numbers of both host and parasite in the present case suggests the possibility of a similar connection.

#### HOST DISTRIBUTION

Table 1 shows the host distribution of 1,217 specimens for which such data are available. The first three species on the list are represented in approximately the ratio in which they were taken in the collections studied. Moles of three species are relatively heavily infested in relation to the numbers taken. Deermice (*Peromyscus* spp.), on the other hand, are very lightly infested in relation to the numbers collected, and must be considered a secondary host. All others are no doubt accidental hosts, and play no important role in the ecology of the species. It seems probable, however, that the ability to feed on any of the common small mammals of the area is an important reason for the abundance of this species.

Most of the specimens from accidental hosts are females, probably an indication of the longer lives and greater food requirements of this sex.

#### SEX RATIO

It is axiomatic that more female fleas are collected than males. Such is not usually the case with *Ctenophthalmus*. Some of our sources did not separate males and females, but among those which did there was a ratio of about 1.2 females per male. This variation was due to a preponderance of females in winter. In all other seasons the number was approximately equal. It seems certain that

the breeding season extends from March to November, thus coinciding with the breeding seasons of the most common hosts.

#### ECOLOGICAL DISTRIBUTION

Some species of fleas show a distinct altitudinal distribution, but *Ctenophthalmus pseudagyrtis* occurs from sea level to the Alpine zone of the Adirondacks. However, of 21 specimens collected in the vicinity of Whiteface Mountain in 1961-62, only one was from elevations above 3,000 feet. Considering the large number of mammals of suitable host species taken during these two summers, this would appear to indicate that the species is very rare at these high elevations. Since Canadian records to the north are all from southern Canada (Holland, 1949), this species is apparently not adapted to extremes of cold.

It is found on species of dry sandy land, such as *Pitymys*, and on such moisture-loving species as *Condylura*. Specimens from predominantly field-dwelling species, such as *Microtus pennsylvanicus*, are balanced by large collections from forest-inhabiting species, such as *Clethrionomys gapperi*. No association with any particular vegetational type is apparent.

It is significant, however, that all of the nine most commonly parasitized species are small mammals which utilize burrows and surface runways extensively. Cursorial species, such as the jumping mice, *Zapus* and *Napeozapus*, are seldom parasitized, while specimens from the arboreal squirrels are equally rare. The burrow-inhabiting chipmunk, on the other hand, is a frequent host. This species, like many other flea species in which the eyes are vestigial, is primarily a burrow-inhabitant species, and transfers much more readily than most species to any small mammal which may travel along these burrows. It probably breeds exclusively in underground nests.

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#### Erratum

In the paper *Additions to the Supplemental List of New Jersey Macrolepidoptera* by Joseph Muller, which was published in the December 1968 issue of the **Journal** (**76**: 303-306), on p. 304 under the SATYRIDAE, the line beginning 638 should read: *eurydice appalachia* R. L. Chermock, 1947.